1. General description


2. Features and benefits

- Average forward current $I_{F(AV)} \leq 0.2 \, \text{A}$
- Reverse voltage $V_R \leq 40 \, \text{V}$
- Low forward voltage typ. $V_F = 250 \, \text{mV}$
- Low reverse current typ. $I_R = 3 \, \mu\text{A}$
- Package height typ. 0.3 mm

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Ultra high speed switching
- LED backlight for mobile application

4. Quick reference data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$T_{sp} \leq 145 , ^\circ\text{C}; \delta = 1$</td>
<td>-</td>
<td>-</td>
<td>0.28 A</td>
<td></td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>-</td>
<td>40 V</td>
<td></td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 200 , \text{mA}; \tau_p \leq 300 , \mu\text{s}; \delta \leq 0.02$ ; $T_j = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>450</td>
<td>525 mV</td>
<td></td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 40 , \text{V}; , T_j = 25 , ^\circ\text{C}$; pulsed</td>
<td>-</td>
<td>13</td>
<td>80 $\mu\text{A}$</td>
<td></td>
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</tbody>
</table>
5. Pinning information

Table 2. Pinning information

<table>
<thead>
<tr>
<th>Pin</th>
<th>Symbol</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>K</td>
<td>cathode[1]</td>
<td><img src="image" alt="Simplified outline" /></td>
<td><img src="image" alt="Graphic symbol" /></td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>anode</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG4002AESF</td>
<td>DSN0603-2</td>
<td>Leadless ultra small package; 2 terminals; body 0.6 x 0.3 x 0.3 mm</td>
<td>SOD962-2</td>
</tr>
</tbody>
</table>

7. Marking

Table 4. Marking codes

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG4002AESF</td>
<td>N</td>
</tr>
</tbody>
</table>

8. Limiting values

Table 5. Limiting values

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25 , ^\circ C$</td>
<td>-</td>
<td>40</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$T_{sp} \leq 145 , ^\circ C; \delta = 1$</td>
<td>-</td>
<td>0.28</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; f = 20 , kHz; T_{amb} \leq 140 , ^\circ C; square wave$</td>
<td>-</td>
<td>0.2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(RM)}$</td>
<td>repetitive peak forward current</td>
<td>$t_p \leq 1 , ms; \delta \leq 0.25$</td>
<td>-</td>
<td>1.2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>$t_p = 8 , ms; T_{j(init)} = 25 , ^\circ C; square wave$</td>
<td>-</td>
<td>3.5</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 , ^\circ C$</td>
<td>[2]</td>
<td>405</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>660</td>
<td>mW</td>
</tr>
</tbody>
</table>
9. Thermal characteristics

Table 6. Thermal characteristics

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1]</td>
<td>[2]</td>
<td>[3]</td>
<td>[4]</td>
<td>[5]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R_{\text{th}(j-a)}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R_{\text{th}(j-sp)}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses $P_R$ are a significant part of the total power losses.


[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm$^2$ each.


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
10. Characteristics

Table 7. Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{(BR)R}$</td>
<td>reverse breakdown voltage</td>
<td>$I_R = 100 , \mu A; , t_p = 300 , \mu s; , \delta = 0.02 , ; , T_{sp} = 25 , ^{\circ}C$</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 0.1 , mA; , t_p \leq 300 , \mu s; , \delta \leq 0.02 , ; , T_j = 25 , ^{\circ}C$</td>
<td>-</td>
<td>120</td>
<td>185</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 1 , mA; , t_p \leq 300 , \mu s; , \delta \leq 0.02 , ; , T_j = 25 , ^{\circ}C$</td>
<td>-</td>
<td>180</td>
<td>245</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10 , mA; , t_p \leq 300 , \mu s; , \delta \leq 0.02 , ; , T_j = 25 , ^{\circ}C$</td>
<td>-</td>
<td>250</td>
<td>320</td>
<td>mV</td>
</tr>
</tbody>
</table>
### Symbol | Parameter | Conditions | Min | Typ | Max | Unit
---|---|---|---|---|---|---
$I_R$ | reverse current | $I_F = 100 \, mA; \, t_p \leq 300 \, \mu s; \, \delta \leq 0.02; \, T_j = 25 \, ^\circ C$ | - | 370 | 440 | mV
 | | $I_F = 200 \, mA; \, t_p \leq 300 \, \mu s; \, \delta \leq 0.02; \, T_j = 25 \, ^\circ C$ | - | 450 | 525 | mV
 | | $V_R = 10 \, V; \, T_j = 25 \, ^\circ C; \, \text{pulsed}$ | - | 3 | 20 | $\mu A$
 | | $V_R = 40 \, V; \, T_j = 25 \, ^\circ C; \, \text{pulsed}$ | - | 13 | 80 | $\mu A$
$C_d$ | diode capacitance | $V_R = 1 \, V; \, f = 1 \, MHz; \, T_j = 25 \, ^\circ C$ | - | 18 | - | pF
 | | $V_R = 10 \, V; \, f = 1 \, MHz; \, T_j = 25 \, ^\circ C$ | - | 7 | - | pF
$t_{rr}$ | reverse recovery time | $I_F = 500 \, mA; \, I_R = 500 \, mA; \, I_{R(\text{meas})} = 100 \, mA; \, T_j = 25 \, ^\circ C$ | - | 1.25 | - | ns

**Fig. 4.** Forward current as a function of forward voltage; typical values

**Fig. 5.** Reverse current as a function of reverse voltage; typical values
**Fig. 6.** Diode capacitance as a function of reverse voltage; typical values

\[ C_d (\text{pF}) \]

\[ V_R (\text{V}) \]

\[ f = 1 \text{ MHz}; T_{\text{amb}} = 25 \, ^\circ\text{C} \]

**Fig. 7.** Average forward power dissipation as a function of average forward current; typical values

\[ P_{\text{F(AV)}} (\text{W}) \]

\[ I_{\text{F(AV)}} (\text{A}) \]

\[ T_j = 150 \, ^\circ\text{C} \]

(1) \( \delta = 0.1 \)
(2) \( \delta = 0.2 \)
(3) \( \delta = 0.5 \)
(4) \( \delta = 1 \)

**Fig. 8.** Average reverse power dissipation as a function of reverse voltage; typical values

\[ P_{\text{R(AV)}} (\text{W}) \]

\[ V_R (\text{V}) \]

\[ T_j = 125 \, ^\circ\text{C} \]

(1) \( \delta = 1 \)
(2) \( \delta = 0.9 \)
(3) \( \delta = 0.8 \)
(4) \( \delta = 0.5 \)

**Fig. 9.** Average forward current as a function of ambient temperature; typical values

\[ I_{\text{F(AV)}} (\text{A}) \]

\[ T_{\text{amb}} (\, ^\circ\text{C}) \]

FR4 PCB, standard footprint

\( T_j = 150 \, ^\circ\text{C} \)

(1) \( \delta = 1; \, \text{DC} \)
(2) \( \delta = 0.5; \, f = 20 \text{ kHz} \)
(3) \( \delta = 0.2; \, f = 20 \text{ kHz} \)
(4) \( \delta = 0.1; \, f = 20 \text{ kHz} \)
FR4 PCB, mounting pad for anode and cathode
1 cm² each
$T_{j} = 150 ^\circ C$
(1) $\delta = 1$; DC
(2) $\delta = 0.5$; $f = 20$ kHz
(3) $\delta = 0.2$; $f = 20$ kHz
(4) $\delta = 0.1$; $f = 20$ kHz

Fig. 10. Average forward current as a function of ambient temperature; typical values

Ceramic PCB, $\text{Al}_2\text{O}_3$, standard footprint
$T_{j} = 150 ^\circ C$
(1) $\delta = 1$; DC
(2) $\delta = 0.5$; $f = 20$ kHz
(3) $\delta = 0.2$; $f = 20$ kHz
(4) $\delta = 0.1$; $f = 20$ kHz

Fig. 11. Average forward current as a function of ambient temperature; typical values

$T_{j} = 150 ^\circ C$
(1) $\delta = 1$; DC
(2) $\delta = 0.5$; $f = 20$ kHz
(3) $\delta = 0.2$; $f = 20$ kHz
(4) $\delta = 0.1$; $f = 20$ kHz

Fig. 12. Average forward current as a function of solder point temperature; typical values
11. Test information

Fig. 13. Reverse recovery definition

Fig. 14. Duty cycle definition

The current ratings for the typical waveforms are calculated according to the equations: $I_{F(AV)} = I_M \times \delta$ with $I_M$ defined as peak current, $I_{RMS} = I_{F(AV)}$ at DC, and $I_{RMS} = I_M \times \sqrt{\delta}$ with $I_{RMS}$ defined as RMS current.
12. Package outline

Leadless ultra small package; 2 terminals; body 0.6 x 0.3 x 0.3 mm

<table>
<thead>
<tr>
<th>Unit</th>
<th>A</th>
<th>A₁</th>
<th>b</th>
<th>D</th>
<th>E</th>
<th>e₁</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>max</td>
<td>nom</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.32</td>
<td>0.03</td>
<td>0.25</td>
<td>0.325</td>
<td>0.625</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>mm</td>
<td>min</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.28</td>
<td></td>
<td>0.23</td>
<td>0.275</td>
<td>0.575</td>
<td>0.13</td>
<td></td>
</tr>
</tbody>
</table>

Note
1. The marking bar indicates the cathode.

Fig. 15. Package outline DSN0603-2 (SOD962-2)
13. Soldering

Footprint information for reflow soldering of leadless ultra small package; 2 terminals

![Soldering Footprint Diagram](sod962-2_fr)

Fig. 16. Reflow soldering footprint for DSN0603-2 (SOD962-2)

14. Revision history

<table>
<thead>
<tr>
<th>Data sheet ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
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<tr>
<td>PMEG4002AESF_S500 v.1</td>
<td>20150505</td>
<td>Product data sheet</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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15. Legal information

Data sheet status

<table>
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</thead>
<tbody>
<tr>
<td>Objective [short] data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary [short] data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
</tr>
</tbody>
</table>

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[2] The term "short data sheet" is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nexperia.com.

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